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Principles and Practice of Construction Costkeeping

Part I—Introductory and Contractor's Equipment

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PRINCIPLES AND PRACTICE OF CONSTRUCTION COSTKEEPING

Introductory and Contractor's Equipment

A discussion of any phase of cost-finding for construction and contracting enterprises would not be complete without first directing attention to the difference between the relation that a cost system for such work bears to the performance of the work, as compared with the relation which exists between the cost system and the execution of orders in the average business. In the majority of manufacturing and other enterprises, the cost of the product is determined, and the selling price is established. In some instances, it is true that orders for the product are taken before manufacturing has begun, but the selling price on future orders is generally established after the cost of manufacture is ascertained. In the construction business, the selling price is usually established before the actual cost of the work contracted for can be determined. The selling price is arrived at by an examination of the plans and specifications for the purpose of finding out the quantity and the quality of work required to be done. This work is then valued upon the basis of cost experience gained from prior contracts. To this valuation is added an amount for contractor's profit, the sum representing the contract price, (selling price). Only in rare cases, does an owner agree to pay the actual cost of the work plus the contractor's profit, without setting some amount as the limit which he shall be called upon to pay.

Purposes of a System

The volume of business in manufacturing and mercantile lines consists mainly of numerous sales of the same commodity. In the construction business, no two orders are alike. Even if the type of building is the same, there are details of construction which vary, such as the nature of the soil which affects the cost of foundation work; interior decoration which might increase or decrease the cost of finished woodwork, marble work, etc.; or the exterior of a building, the cost depending upon whether the exterior is built up of brick, cutstone or marble. Because of increased costs of transportation and modifications in labor rates in different sections of the country, and even in the same State, the cost of performing work in one city is not the same as it would be in another, even though identical work is done.

Therefore, a cost system for construction work must be sufficiently complete to obtain costs for different classes of work, considering the conditions under which the work is done and the local-

ity where the work is carried on. One purpose of the system is to develop data which can be safely used as a guide in determining the selling price of similar work in the future.

Another important purpose of a cost system is to control the cost of production while work is in progress. A purchasing agent may be very efficient, obtaining supplies and material at very low prices. If, however, proper control of labor costs is lacking, the superintendent or foreman in charge of the mechanics and laborers may lose more in a short time than the purchasing agent and others can save during the entire performance of the contract.

Cost Components

The elements which enter into the cost of work are:—1. Payrolls of mechanics and laborers; 2. cost of material; 3. service charges, including hauling, surveys, tests, insurance, commissary operation, stable operation, etc.; 4. cost of work sublet to sub-contractors; 5. job overhead, representing the cost of supervision, maintenance of a field office, etc.; 6. charges for use of contractor's equipment; 7. expenses of contractor's office which are not overhead expenses. To the total cost is added the contractor's profit to arrive at selling price.

The overhead expense of the main and district offices should be taken out of construction profits.

It is not the purpose of this article to discuss the relation of all these factors to cost, but only to deal with the item of contractor's equipment and its effect.

Contractor's Equipment

A large variety of equipment may be required in carrying out construction work, depending upon the nature of the work, some of which necessitates the use of small locomotives, cars and tracks, teams, wagons, etc.; while other work may require hoisting engines, derricks, concrete mixers, surveying instruments, cableways, locomotive cranes and auto trucks, etc. In addition to these larger items of equipment, the work may require lumber, timber and the vast variety of smaller tools such as wheelbarrows, steel blocks, chains, wire rope to shovels, pickaxes, picks, crowbars, etc. The aggregate of this equipment represents a large capital outlay. In arriving at costs of operation, a contractor very often reasons in this way: "The equipment is paid for, is in the store yard, and I'll use it on this job. I won't have to lay out any money for it, so I will not include anything in my cost for it." He may figure a certain amount for operating expenses, such as coal for the locomotive and wages of the engineer, but nothing for the use of equipment, and often nothing for repairs. Such a policy ignores two elements of cost, namely, depreciation and maintenance and repairs. Therefore, these expenses come out of the general profits of the business instead of being charged to the particular operations which gave rise to them. A contractor might perform work and find upon completion that his so-called "profit" was represented by second-

hand equipment, the salvage value of which when combined with payments received for the work would be less than the cash outlay for wages and material.

Admitting therefore that the cost of construction should include a charge for use, maintenance and upkeep of equipment, upon what basis should such a charge be made? Should it be figured upon a flat percentage of the value of the equipment used? Assume for the purpose of illustration that 20 per cent. is used. As a result $600 would be charged for the use of a hoisting engine costing $3,000 and $1.20 for a wheelbarrow purchased for $6. The actual time during which the hoisting engine was on the operation might be only one month and that of the wheelbarrow three or four times as long. Then again a charge of $600 for one month's use of an engine would be out of all proportion to the price (about $35.00 per week) at which one could be rented from agencies which make a business of renting certain equipment. If the rate of percentage were lowered to make the charge for the use of the engine more reasonable, then the amount received for the use of the smaller equipment would be considerably less than the service which it renders.

It is apparent, therefore, that some plan must be adopted which will classify the equipment, and a method of charging used which will take into consideration not only the element of time during which the equipment is on the operation, but also the ratio of the value of the service rendered to the value of the equipment.

Equipment can be classified into perhaps three major groups:

1. Heavy equipment; 2, general equipment and 3, perishable equipment.

Lists of equipment appear on pages 11-15, which give a sufficient number of items to indicate approximately what equipment should be classified under each heading. The lists are intended only to illustrate the general idea of dividing equipment into three classes.

Heavy Equipment

The class, "Heavy Equipment," would include such larger items as locomotives, hoisting engines, derricks, steam shovels, tractors, auto trucks, etc. (See list on page 11.) Heavy equipment should be placed upon a rental basis and the rental charge included in the cost of construction. The rental charge would be calculated upon the basis of the number of days the piece of equipment was on the operation, at a fixed rate per full week, or full month. For example, if the fixed rate is $25 per week, and the equipment were delivered to the job say on Thursday, the charge for that week would be for one-half of a week, or $12.50.

In determining the rate to be used several factors must be considered. Among these are:

Probable life of equipment, cost of ordinary repairs, cost of storage, insurance, taxes, etc., average idle time when equipment

is in storage yard and not on any operation, salvage value at end of useful life of equipment, and rate charged by agencies making a business of renting equipment.

The problem of idle time is a very important one in construction cost accounting and the percentage allowed depends upon the classes of work performed, and the variety of equipment kept. If buildings only were constructed, derricks would be limited practically to hoisting steel columns and beams. If bridge work were done, the derrick could be used almost throughout the entire job. In the former case, unless there was a succession of new buildings started, the time when the derricks were in use on operations would be but a small fraction of each year. In the latter case, the average idle time per year over a reasonable period of years would be very small. The same illustration would apply to most heavy equipment. Reference to the table of percentages appearing on page 14 will show the importance of idle time as a cost factor. This table was prepared by the American Association of General Contractors, and represents the average experience of a number of contractors. The last column shows the annual percentage of the initial cost of the equipment which must be charged in order to cover depreciation, repairs, upkeep and interest on the investment. By deducting the percentage included for interest on the investment you arrive at a percentage of the cost of the equipment which must be obtained annually in order to get back the actual cash outlay, viz:—the initial cost of equipment, repairs and upkeep, less salvage value at the end of the useful life. With this new percentage of annual return determined, the effects upon the rental charge during the time when the equipment is in use that would result from equipment being on jobs only 26 weeks a year may be noted. If an electric hoisting engine costs about $3,000, 23% or $690 is the amount of annual return that would have to be obtained. If the $690 were divided by 52 instead of by 26, the total amount received would only be 50% of the amount necessary to return the actual cash outlay.

Another condition which must not be overlooked is the existence of agencies which make a business of renting certain items of equipment. The rentals which they charge are sufficient not only to pay their expenses, but in addition to yield a profit. The contractor makes his primary profit from the work of construction. Therefore he should establish rates which are lower than those charged by equipment-renting agencies.

General Equipment

The element of time should not enter into the treatment of general equipment. For a list of general equipment see page 12. The cost of labor involved in keeping records necessary to charge equipment of this class on a rental basis is too great in proportion to the results obtained. Furthermore, none of it can be rented from equipment-renting agencies. If desired for use on an operation, it must be purchased from a supply house. Therefore, a just method

would appear to be to establish a charge based upon a certain percentage of the inventory value of the equipment. After this percentage has been established, the operation should be debited with the inventory value of the equipment as and when delivered, and the operation subsequently given credit with a proper percentage of the inventory value of the equipment when returned in good (useable) condition. For example, if it is decided to fix, say 60%, as the charge for use, the operation would be debited with $150 as the value of equipment delivered, and would be credited with 40% or $60 when returned in good condition. If the equipment upon its return is in poor condition, and cannot be taken into stock without extensive repairs, the only credit the operation would be entitled to would be the amount derived as salvage when sold. It is to be noted, therefore, that the operation is charged with: 1. 60% for the use of all equipment returned in good or useable condition; 2. inventory value, less salvage, of all equipment returned in poor condition; and 3. inventory value of such equipment as may be lost or destroyed. "Useable," as here employed, means in condition to be used again after making such repairs as are due to ordinary wear and tear.

Perishable Equipment

Perishable equipment is so-called for the following reasons: 1. The small likelihood of the return of any of the equipment in useable condition; 2. the cost of repairs necessary to put the equipment in useable condition usually approximates the original cost.

A list of perishable equipment appears on page 13.

The failure to return perishable equipment is due to the strong probability of the equipment's being lost on the operation because of its size and character and conditions under which work is performed. The equipment can be lost, buried in rubbish, earthwork, etc., and occasionally some is stolen. The cost of keeping an accurate record and close tally so far exceeds the value of the equipment that too close a tally of small equipment is not justified. However, a record can be profitably kept in manufacturing plants where trenches, excavation, rubbish piles, and mounds of unused loose material do not exist. This paragraph has reference to the smaller items of equipment used in the early stages of construction of buildings, hotels, etc., and to practically all stages of field work covering a considerable area, such as the construction of dams, large housing developments, etc. For the majority of items of equipment it is possible to make the workmen personally accountable.

Some equipment may outlive an operation, but average wear and tear results in such heavy damage being done that the cost of repairs exceeds what might be charged for rental. However, the operation should receive credit for the amount obtained as salvage upon the sale of equipment.

Charges to the operation would be made upon the same basis as

for "General Equipment," and equal credit given for any returned in good condition. However, the probability of any equipment being so returned is small.

Repairs

The determination of the repairs that should be charged to cost of operations and those which should be borne by the contractor as an item of equipment overhead expense, must be made after considering the facts that make repairs necessary.

A charge is made for the use of equipment, either at a fixed rate per fixed period of time, or at a percentage of the value of the equipment. Anyone who pays this charge would be justified in expecting that the equipment be kept in running order and in useable condition without further cost to him, except such additional cost as might result from misuse. To take an extreme case, it would be manifestly unfair to deliver equipment which was not in good working order and expect an operation to pay rental each day that the equipment was idle undergoing repairs, to say nothing of the cost of making the repairs. A general rule, which is fair to both the contractor's equipment department and to the operation, is for the department to make no charge for use except for equipment delivered in working order, ready for use on delivery at the site (except for the time necessary to assemble the equipment); and for the equipment department to bear all expenses in making good any damage due to ordinary wear and tear, with the operation standing the cost of repairs and replacements resulting from accident, gross carelessness, misuse, or from theft or loss of parts. To illustrate, assume that an electric hoisting engine is rented. While in use on the operation, a brake is broken because a weight is dropped upon it. The cost of supplying a new brake should be borne by the operation. On the contrary, after being in use on several operations, the armature will require rewinding. While far more costly than supplying a new brake, the rewinding is due ordinarily to continued use, wear and tear and hence the cost should be borne by the equipment department. Some of the brass parts may be stolen. The cost of replacing them is chargeable to the operation.

In deciding what is "ordinary wear and tear," the equipment department should absorb as the expense of maintaining equipment all costs of repairs and replacements which do not clearly result from faulty work on the operation.

Special Equipment

In order to do a particular piece of work in certain cases, some special item of equipment must be purchased, either because it cannot be rented from an equipment renting agency, or because the purchase price, less the salvage upon completion of the work, is less than the total rental which would be charged by such an agency.

Such special equipment should be considered as part of the cost of operation when purchased (being separately classified on

the statement of cost until it is sold) and when disposed of, the salvage value should be credited to the cost. To illustrate, ordinarily it might be more advantageous for a general contractor to have an excavating contractor do the excavating. However, the general contractor might secure a job in which the excavation was of such magnitude as to make it more economical to invest in steam shovels and do the work with his own organization, disposing of the steam shovels at the end of the work. Under such circumstances, the cost of excavation should clearly include the purchase price of the steam shovels, less the salvage value realized upon the sale of the shovels.

The rule to be followed in differentiating "special equipment," and "standard" or "permanent" equipment should be based upon the conditions peculiar to each contractor's business. It would be unreasonable to expect a contractor to carry, as a permanent investment, sufficient equipment to do an unlimited volume of business of greatly varied character. The investment necessary would be out of all proportion to the capital invested in the business, or ordinarily required. Bearing in mind the period during which a large proportion of the equipment required for an abnormal business is likely to be idle and earning no revenue, so heavy an investment would be extremely unprofitable.

A contractor could reasonably be expected to own sufficient equipment to perform a normal volue of business of the average class of work. Any equipment not coming within this limitation might very properly be classed as "special equipment purchased for a particular operation and charged thereto when bought, credit being made for the salvage value received from the sale.

Pricing Equipment

Proper attention should be given to pricing equipment. Keeping in mind that the plan outlined in this article provides for the equipment being first sold in connection with an operation and later being repurchased at an agreed upon price (fixed percentage of inventory value), the prices used in the inventory for "General Equipment" and "Perishable Equipment" in reality are sales prices and not cost prices. The prices should be established at fixed times, (annually or semi-annually) and should be approximately those which supply houses might be expected to charge during the period for which the prices are set. This can be done by any competent purchasing agent with a knowledge of the trend of market conditions, so that collectively there would be very little variation between inventory prices and those of the supply houses. Should purchases of equipment be made during the period, they are taken into inventory account at the fixed inventory values, the differences between the purchase price and inventory value being temporarily carried in a suspense account.

Should the date for determining inventory prices occur during a rising market and the inventory values increased, the difference between the former inventory values and the new ones should not

be taken up as a profit, but should appear on the general books as a separate item until the profit is actually realized. Until such time they should be treated on the balance sheet as a reduction of inventory in the same manner as the reserve for depreciation. No profit is realized except, as and when the equipment is sold in connection with an operation, and the advanced prices paid. The effect of this arrangement is to carry the equipment at cost prior to its sale.

Profit represented by the difference between cost and inventory values on equipment sold need only be taken up periodically when prices are re-established, the amount involved usually being small.

Pricing Used Equipment

When equipment (other than that placed on an operation at a fixed rate for a fixed period of time) is valued for purposes of sale, should that value be a depreciated one because of previous use?

When equipment which has been previously used is delivered to an operation, the sale to the operation differs from the "sale" as used in the ordinary mercantile sense. When sales, except retail sales, are made in manufacturing and mercantile lines, the goods generally will be offered for resale. This resale feature does not apply to equipment, the contractor's equipment department agreeing to repurchase all equipment in good condition at a pre-determined price (fixed percentage of inventory value). If the equipment is not in good condition, what remains has only a junk value.

The difference between the sale price and the repurchase price, represents a charge for use. In other words, what is sold to an opration is not the piece of equipment itself but the service which that equipment renders. Therefore, the condition which controls the charge for the service must be the kind of service rendered. When a man hires a taxi, he pays for the service of conveying him from one point to another. Should a higher rate be charged for riding in a new taxi than in one that has been used for a year or more? If a team is hired, should the rate per day be dependent upon the length of time the owner has owned and used the team? Yet in both cases and in all others depreciation is continually going on.

If the owner of the used taxi should not lower his rates because of the time the taxi has been in use, as distinguished from the kind of service it furnishes, there is no reason why the charge for service for used contractors' equipment should be different from that for new equipment, provided it does the work required. Is a plank bespattered with mortar any less able to stand the strain of weight than a new plank in a lumber yard? It is equitable to make the same charge for service for used equipment as is made for equipment received directly from a supply house. Since the basis of the service charge is a fixed percentage of the inventory value, the used equipment should be priced in the inventory at the same price as the new equipment, provided of course that it is in good working order.

By "inventory" is not meant "net book value," but the gross inventory account. The net amount at which equipment is to be carried in a balance sheet is a matter for each contractor to decide for himself, provided he always has a sufficient amount set up to at least take care of depreciation. The net book value has no relation to the amount that forms the basis of the service charge. Suppose that a contractor who is very conservative decides to carry equipment in his balance sheet at twenty cents per dollar of inventory value. Does that mean the real value of a $3,000 engine is only $600? If he did not show equipment at all as an asset, would it mean that the equipment has no intrinsic value? Assume that furniture as a matter of policy is treated as an expense and not as an asset. Does that mean that if one desires to dispose of a second-hand or used desk, he should give it away? The net amount at which an asset appears upon the books has no bearing on the sale price, or charge for service, unless that net amount represents cost.

Movement of Equipment, and Statements

In order to keep within the scope of this publication, very little will be said about the control of the movement of equipment, and statements showing the results of the operation of equipment. Proper control should be established to cover the movement of equipment from store yard to operations and return. Any plan which provides for the control of the shipping system and a continuous inventory will be adequate.

The operating statements to be prepared depend entirely upon the amount of the investment and the frequency and volume of shipments. A fairly complete set of statements would show:

1. The total investment, and investment at each location (each operation and store yard).
2. A trading account for each class of equipment.
3. General Income Statement.
4. Deliveries, returns and losses of equipment at each location (each operation and store yard).
5. Collective comparison of difference between purchase prices of equipment bought during period and established inventory values.

Heavy Equipment[1]

Adding Machines
Air Receivers
Auto Crane
Auto Trucks and Trailers
Boilers, Upright
" Locomotive
Buckets, Clam Shell
" Orange Peel
" Dragline
Cars, Dump and Flat

[1] The basis for charging this equipment to an operation appears on page 5.

Compressors, Air
Crushers, Rock
Derricks
Draglines
Drills, Power
Engines
Excavators
Graders, Road
Hoists, Steam, Gasoline and Electric
Locomotives
Mixers, Concrete and Mortar
Motors
Pile Drivers and Hammers
Plows
Pumps, Power
Rails
Riveting Machines
Rock Channellers
Road Rollers, Steam
Scrapers
Steam Shovels
Towers, Steel, Concrete
Transits and Levels
Tractors
Wagons, Dump and Hauling
Welding Apparatus
Safes
Typewriters

General Equipment[1]

Adzes
Anvils
Augers, Ship
Axes
Barrows, Mortar
" Tile
Bars, Crow
Blocks, Steel
" Wood
Bobs, Plumb
Braces, Carpenter
Cages, Elevator
Carts, Concrete
Chairs, Office
Chains
Checks, Time
Clamps, Beam
" Brick
" Universal
Clips, Crosby
Cutters, Pipe
" Bolt
" Bar
Desks
Dollies
Turnbuckles
Tubs, Mortar Steel
Vises
Wrenches, Large
Concrete Chutes
Lights, Carbic
" Millburn
Car Movers
Pullers, Rod
" Sheet Pile
Drills, Twist
" Breast
" Ratchet
" Star
Edges, Straight
Expanders, Tube
Extinguishers, Fire
Fans, Electric
Forges
Frames, H. S.
Gongs, Brass
Grinders
Guys
Hammer
" Claw
Hangers, Center
" Joist
Heaters, Oil, Electric
Hods
Hoes
Hooks, Timber
Horses, Mason
" Carpenter
Jacks
Ladders
Levels, Spirit
Lewises, Stone
Boring Machines
Mauls
Pumps
Reamers
Engineers' Rods
Rollers, Wood
Rope, Wire
Salamanders
Saws, Cross Cut
Scales (weighing)
Shackles
Shanties
Shovels
Stocks and Dies
Grindstones
Switches, Track
Tapes, Steel
Track, Industrial
Tongs

[1] The basis for charging this equipment to an operation appears on page 6.

Lumber of reasonable length and following sizes:

2	x	9	
2	x	12	
3	x	12	
6	x	6	and up
8	x	8	" "
8	x	12	" "
10	x	10	" "
12	x	12	" "
13	x	13	" "
14	x	14	" "
16	x	16	" "

PERISHABLE EQUIPMENT[1]

Bellows
Belting
Blades, H. S.
Boots
Brooms
Brushes
Cans, Oil
Clamps, Hose
Clothing, Oilskin Pants, Coat, Hats
Coolers, Water
Drivers, Screw
Files
Hasps
Hatchets
Hose
Pails, Wood
" Galvanized
Pliers
Rope, Manilla
Saws, Hand
Tarpaulins
Wrenches, Small
Short Length Lumber and Timber

[1] The basis for charging this equipment to an operation appears on page 7.

Items of Equipment[1]	Economical length of life	Annual depreciation	Equivalent annual interest @ 6½%	Annual shop repairs	Annual field repairs	Storage and incidentals	Insurance	Taxes	Total annual charge per cent of initial investment
	Yrs.	%	%	%	%	%	%	%	%
Auto-crane	5	15	4	6	5	3½	1	1	35½
Auto-truck	3	25	4	20	20	3½	1	1	74½
Auto-trailer	5	15	4	6	5	3½	1	1	35½
Backfiller, power	4	18¾	4	6	7	3½	1	1	41¼
Ballast spreader	8	9½	4	6	4	3½	1	1	29
Boiler, upright	8	9½	4	20	5	3½	1	1	44
Boiler, locomotive	8	9½	4	15	5	3½	1	1	39
Bucket, clam shell	4	18¾	4	15	6	3½	1	1	49¼
Bucket, orange-peel	4	18¾	4	25	6	3½	1	1	59¼
Bucket, dragline	4	18¾	4	12	3	3½	1	1	43¼
Cars, steel dump	6	12½	4	8	4	3½	1	1	34
Cars, wood dump	5	15	4	7	3	3½	1	1	34½
Cars, flat	8	9½	4	4	3	3½	1	1	26
Cars, hopper	5	15	4	8	3	3½	1	1	35½
Compressors, steam	7	10¾	4	6	3	3½	1	1	29¼
Compressor, gasoline	4	18¾	4	6	7	3½	1	1	41¼
Compressor, electric	6	12½	4	3	3	3½	1	1	28
Concrete chutes	2	37½	4	15	15	3½	1	1	77
Conveyor, belt	2	37½	4	7	6	3½	1	1	60
Conveyor, bucket	2	37½	4	10	6	3½	1	1	63
Crusher, rock	6	12½	4	5	3	3½	1	1	30
Derrick, wood	5	15	4	4	4	3½	1	1	32½
Derrick, steel	10	7½	4	4	3	3½	1	1	24
Dragline, steam	6	12½	4	9	8	3½	1	1	39
Dragline, gasoline	4	18¾	4	10	10	3½	1	1	48¼
Dragline, electric	8	9½	4	7	7	3½	1	1	33
Drill, tunnel carriage	5	15	4	8	8	3½	1	1	40½
Drill, traction well	6	12½	4	7	10	3½	1	1	39
Drill, tripod	4	18¾	4	7	10	3½	1	1	45¼
Drill, jack hammer	4	18¾	4	7	6	3½	1	1	41¼
Engine, gas	6	12½	4	8	8	3½	1	1	38
Engine, steam	10	7½	4	5	5	3½	1	1	27
Excavator, cableway	6	12½	4	4	12	3½	1	1	38
Excavator, Keystone	5	15	4	8	4	3½	1	1	36½
Excavator, trench	5	15	4	8	6	3½	1	1	38½
Forms, steel concrete	2	37½	4	20	20	3½	1	1	87
Graders, common road	4	18¾	4	12	6	3½	1	1	46¼
Graders, elevating	4	18¾	4	15	7	3½	1	1	50¼
Hoist, steam	10	7½	4	6	4	3½	1	1	27
Hoist, gasoline	6	12½	4	7	8	3½	1	1	37
Hoist, electric	8	9½	4	5	3	3½	1	1	27
Locomotive, Indus.-steam	9	8½	4	6	4	3½	1	1	28
Locomotive, Indus.-gas	4	18¾	4	13	10	3½	1	1	51¼
Locomotive, Indus.-battery	4	18¾	4	15	4	3½	1	1	47¼
Locomotive, Stand. gage	10	7½	4	6	4	3½	1	1	27
Locomotive, crane, steam	8	9½	4	7	8	3½	1	1	34
Locomotive, crane, electric	8	9½	4	6	4	3½	1	1	29

This tabulation was prepared by the American Association of General Contractors. See reference to it on page 6.

Items of Equipment[1]	Economical length of life	Annual depreciation	Equivalent annual interest @ 6½%	Annual shop repairs	Annual field repairs	Storage and incidentals	Insurance	Taxes	Total annual charge per cent of initial investment
	Yrs.	%	%	%	%	%	%	%	%
Mixer, steam	5	15	4	12	4	3½	1	1	40½
Mixer, gasoline	4	18¾	4	13	8	3½	1	1	49¼
Mixer, electric	6	12½	4	12	4	3½	1	1	38
Mixer, paving steam	5	15	4	13	4	3½	1	1	41½
Mixer, paving gas	3	25	4	16	9	3½	1	1	59½
Motors	6	12½	4	6	4	3½	1	1	32
Pile driver, steam	8	9½	4	7	5	3½	1	1	31
Pile driver, track	10	7½	4	5	3	3½	1	1	25
Pile hammer, steam	7	10¾	4	7	3	3½	1	1	30¼
Pipe, galvanized	3	25	4	5	6	3½	1	1	45½
Plows	3	25	4	15	10	3½	1	1	59½
Pneumatic conc. mach.	4	18¾	4	20	8	3½	1	1	56¼
Pumps, centrifugal	8	9½	4	6	4	3½	1	1	29
Pumps, piston	6	12½	4	7	5	3½	1	1	34
Pumps, pulsometer	8	9½	4	2	4	3½	1	1	25
Pumps, Emerson	8	9½	4	2	4	3½	1	1	25
Rails	8	9½	4	5	3	3½	1	1	27
Riveter, air	5	15	4	8	4	3½	1	1	36½
Rock Channeler	6	12½	4	7	8	3½	1	1	37
Roller, steam road	10	7½	4	5	3	3½	1	1	25
Saw rigs	4	18¾	4	10	15	3½	1	1	53¼
Scraper, wheel	3	25	4	8	4	3½	1	1	46½
Scraper, slip	1	75	4	25	10	3½	1	1	119½
Scraper, fresno	2	37½	4	25	15	3½	1	1	87
Shovel, steam	6	12½	4	7	6	3½	1	1	35
Shovel, gasoline	4	18¾	4	9	7	3½	1	1	44¼
Shovel, electric	7	10¾	4	6	5	3½	1	1	31¼
Switches, fabricated	3	25	4	3	3	3½	1	1	40½
Tower, steel hoist	7	10¾	4	3	4	3½	1	1	27¼
Tractor, wheel gas	6	12½	4	9	5	3½	1	1	36
Tractor, caterpillar	5	15	4	15	10	3½	1	1	49½
Wagons, dump	4	18¾	4	17	3	3½	1	1	48¼
Wagons, hauling	4	18¾	4	12	3	3½	1	1	43¼
Wagon loaders, power	5	15	4	10	6	3½	1	1	40½

[1] This tabulation was prepared by the American Association of General Contractors. See reference to it on page 6.